



# Alternatives Analysis Threshold and 1,4-Dioxane

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August 21, 2019



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Cal/EPA

# Outline

- The Alternatives Analysis Threshold (AAT)
  - Implications
  - Key Points
  - Nuances of DTSC's mandate and approach
- Proposed AAT for discussion
  - Laboratory procedures
  - Other product regulations
  - Estimated impacts on the California water supply



# AAT: Implications, Theoretical Timeline

2020	2021	2022
<ul style="list-style-type: none"> <li>Propose Priority Product</li> <li>Release Proposed Priority Product Profile</li> <li><b>Release AAT</b></li> <li>Open comment period</li> </ul>	<ul style="list-style-type: none"> <li>Release Notice of Proposed Action to adopt the Proposed Priority Product through rulemaking</li> <li>Hold workshop</li> </ul>	<ul style="list-style-type: none"> <li>Regulations go in to effect</li> <li><b>Manufacturers have 180 days to submit.</b></li> </ul>

1,4-Dioxane Concentration	Manufacturer Submission
Below AAT in product	AAT Notification with verification
Above AAT in product	Applicable submission per the regulations, such as a Preliminary Alternatives Analysis



# AAT: Key Points

- DTSC must set an AAT for a **contaminant** Chemical of Concern in a Priority Product
- AAT = Practical Quantitation Limit (PQL)\* by default
  - PQL = 5 to 10 times the Method Detection Limit (MDL)
- AAT is set at the **product** level, not the ingredient level
  - Many ingredients may have 1,4-dioxane contamination
  - If a product concentration is *above* the AAT, determine and address the sources of the contamination during the Notification process.

\*defined in Section 69501.1(a)(52): “The lowest concentration of a chemical that can be reliably measured within specified limits of precision and accuracy using routine laboratory operating procedures.”



# AAT: Nuances of the mandate and approach

- DTSC cannot set AAT above PQL without good reason
  - “...it would not be prudent for DTSC to establish a threshold above the PQL absent information demonstrating that a higher level is appropriate.” – Final Statement of Reasons
- Not a risk-based determination
- Not necessarily a health-based determination



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# Proposed AAT: Available Laboratory Procedures

- 1,4-dioxane is a challenging compound to measure due to its volatility and miscibility, which lead to low recovery
- Most common techniques:
  - Gas Chromatography – Mass Spectrometry (GC-MS)
  - Gas Chromatography – Flame Ionization Detection (GC-FID)
- Many labs use US EPA Method 8260 or 8270 and modify to include isotope dilution, an internal isotope standard, and/or additional extraction techniques
- Existing methods seem capable of PQLs at or below 1 ppm



# Proposed AAT: Other Product Level Regulations

- Federal level:
  - 1,4-dioxane presence in products is not regulated
- State level:
  - Pending New York legislation that would take effect 2023
    - *1 ppm in household cleansing products*
    - *1 ppm in personal care products*
    - *10 ppm in cosmetics*





# Proposed AAT: Impacts on CA Water Supply

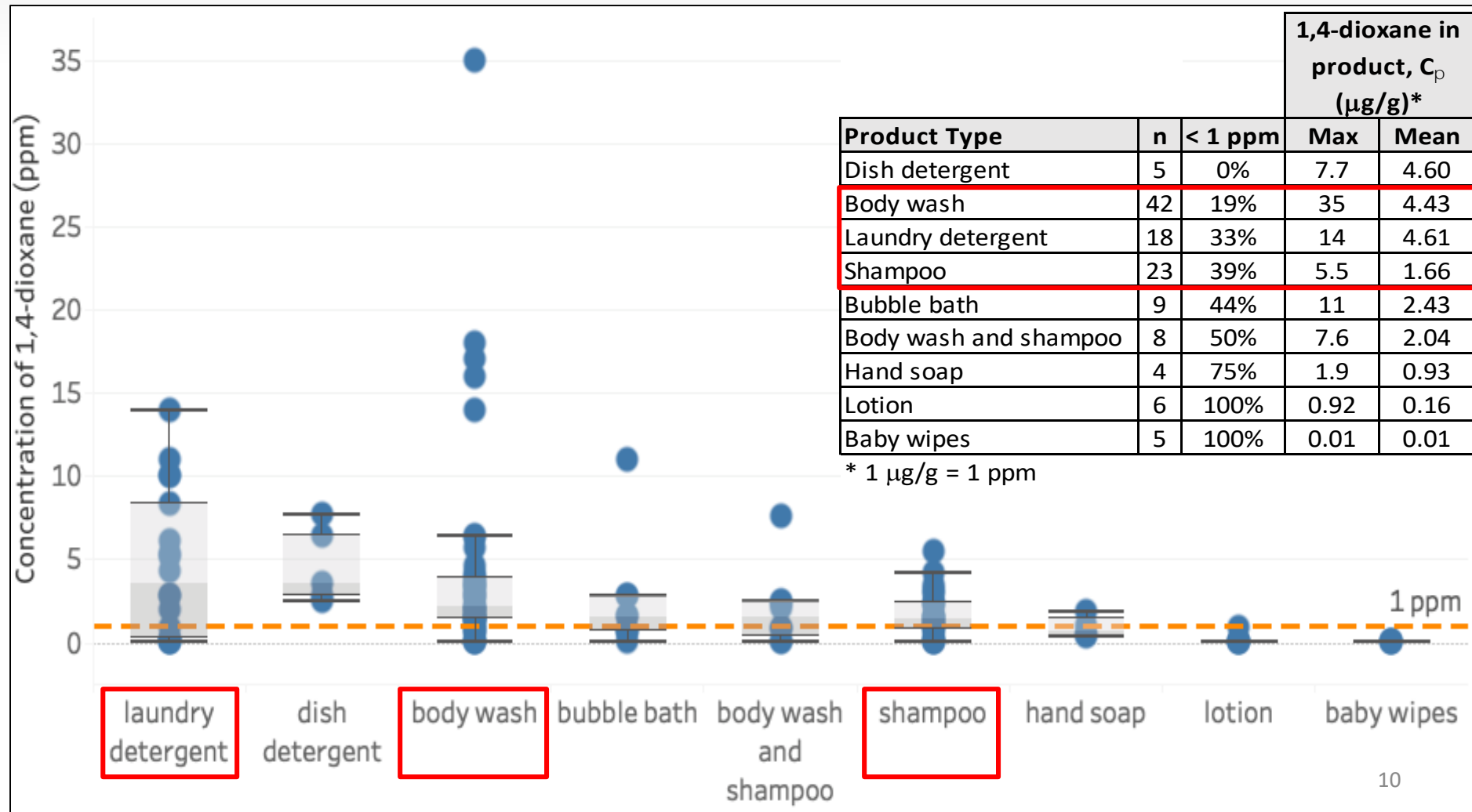
How much 1,4-dioxane found in wastewater influent is attributable to personal care and cleaning products?

- Concentrations of 1,4-dioxane in products
- Product use estimates
- Southern California water treatment plant data



# Proposed AAT: Impacts on CA Water Supply

## Concentrations of 1,4-Dioxane in Products\*



Products in red had sufficient data to perform estimated impact calculations.

\*Sarantis et al. 2009, Citizens Campaign for the Environment 2019



# Proposed AAT: Impacts on CA Water Supply

## Product Use Estimates\*

Product	Activity	Product used per activity $m_{pa}$	Water used per activity $V_a$	Activity frequency per person per year
Laundry detergent	Laundering	98.5 g	189 L	100
Shampoo	Showering	13.1 g	65 L	312
Body wash	Showering	15.5 g	65 L	312



\* <https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/08/14-Dioxane-Draft-AAT-for-August-2019-Workshop.pdf>

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Image credits: Nicole Koehler, 2009; US Dept. of Energy, 2012

# Proposed AAT: Impacts on CA Water Supply

## Southern California Water Treatment Plant Data\*

Water reclamation plant	Population served	Residential MGD	Laundering influent	Showering influent
WN WRP	150,000	7.8	26.2 %	28.1%
OCSD	2,600,000	176	20.2 %	21.7 %
SJC WRP	1,000,000	58.4	23.4 %	25.2 %
<b>Weighted average</b>	--	--	<b>21.3%</b>	<b>22.7%</b>



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\*Data from Los Angeles County Sanitation Districts and Orange County Sanitation District

Image credits: David Blackwell, 2008; Michael Jarmoluk, 2017



# Proposed AAT: Impacts on CA Water Supply

## Contribution from Personal Care and Cleaning Products

- Wastewater influent in Los Angeles County Sanitation Districts hovers around **1 µg/L**
- Because standard treatment is ineffective, influent  $\approx$  effluent
- Current 1 µg/L effluent notification level, possible 0.35 µg/L

1,4-dioxane in product (ppm)*	1,4-dioxane in wastewater influent from select personal care and cleaning product use (µg/L)		
	Laundrying	Showering	Total
Dataset Max	1.55	2.15	<b>3.70</b>
Dataset Mean	0.51	0.32	<b>0.83</b>
3	0.33	0.30	<b>0.63</b>
2	0.22	0.20	<b>0.42</b>
1	0.11	0.10	<b>0.21</b>

\* 1 ppm = 1 µg/g





# Conclusions

- 1 ppm appears to be a reasonable AAT
  - Lab analyses suggest it is at or above reasonable PQLs
  - Would significantly reduce burden on wastewater influent
  - Limited data suggest it is technically feasible
  - Consistent with proposed legislation in New York
- Want to hear from Panelists and stakeholders what the impact of this AAT would be, what challenges are associated with meeting it, etc.



# Questions for Panel

- Is it feasible?
- What portion of the industry would meet that level now? With minimal, some, great effort?
- What factors will companies consider when deciding to try to meet the AAT or conduct an AA?

